NAME Allan Pelton

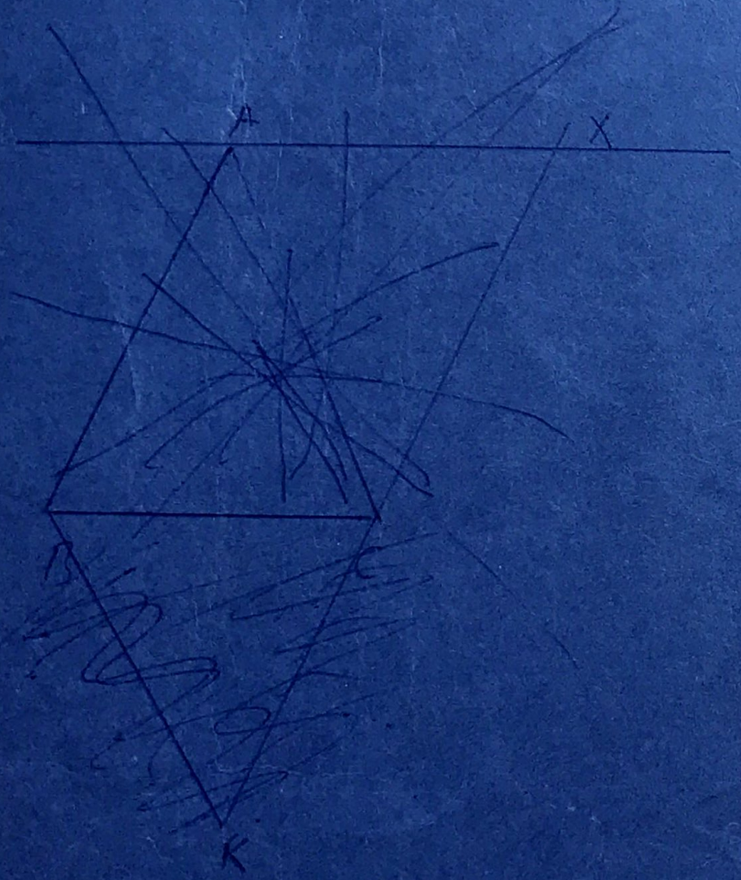
SUBJECT Geometry & Algebra

FORM III DATE 11/11/54

E.S.A., LONDON

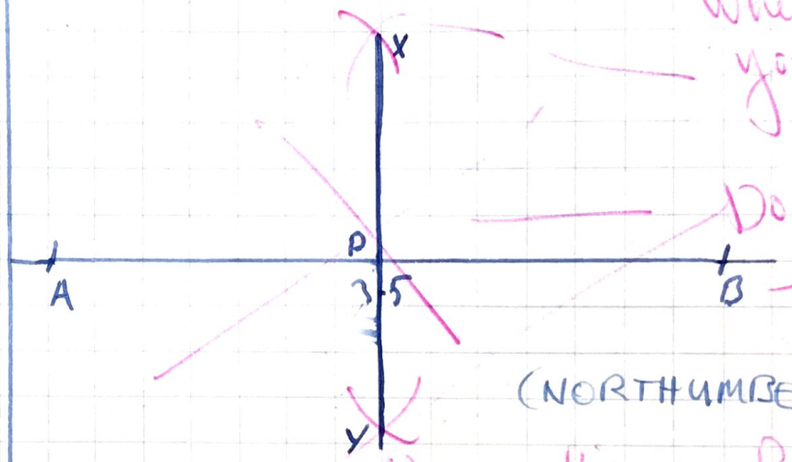
Newton House

School



Geometry. 12/11/54

1. AB is a st line of length 3·5 cms the l^r bisector of AB



where are your arcs!

Do in PENCIL
POINTS only

(NORTHUMBERL. AVE). in INK

Draw a line any length Mark off AB = 3·5

Method; centres A B make arc = to AB above and below AB at X and Y join XY let it cut AB at P)
The XY is req^d bisector.

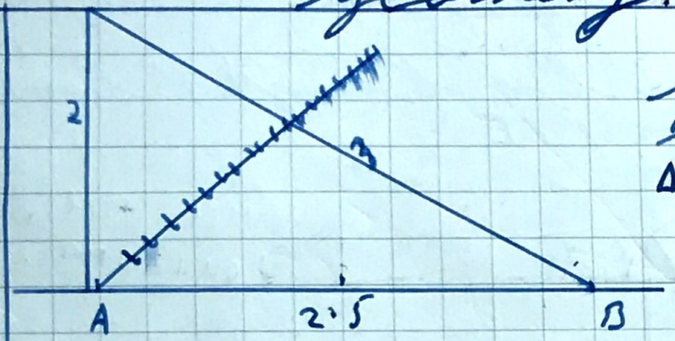
Q.E.D.

5/10

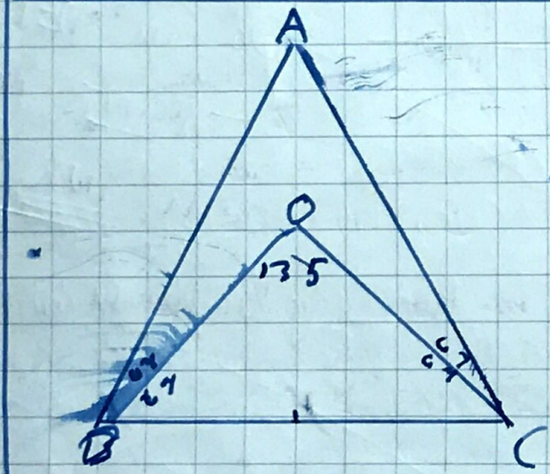
You can have a look at your homework 2·2 2·2 3·5 3·5 OUGHT TO BE IN A NUT-House BE YOUR AGE?

Geometry. 12/11/54

8



Given, you have to construct a Δ of 2. 2·5. 3.



Weak

33/100

∴ Prove: $\angle BAC = 90^\circ$

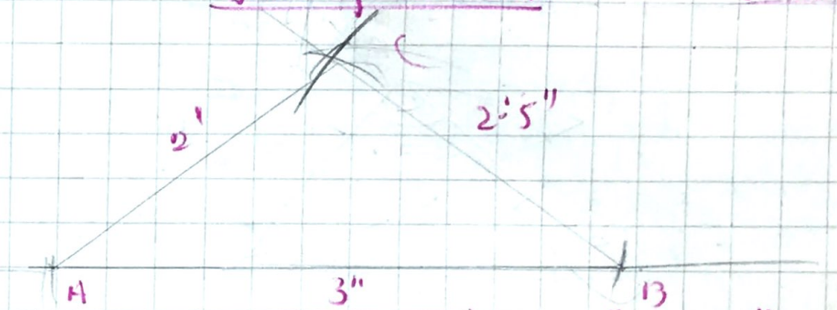
Proof: Let $\angle ABO = \angle OBC = x^\circ$
and Let $\angle ACO = \angle OCB = y^\circ$

∴ In Δ DBC, $135^\circ + x + y^\circ = 180^\circ$
$\therefore x + y = 45^\circ$

In Δ ABC
$\angle BAC + 2x + 2y = 180^\circ$
$\therefore \angle BAC = 180 - 90 = 90^\circ$ QED

Geometry Correction 16-x1-54

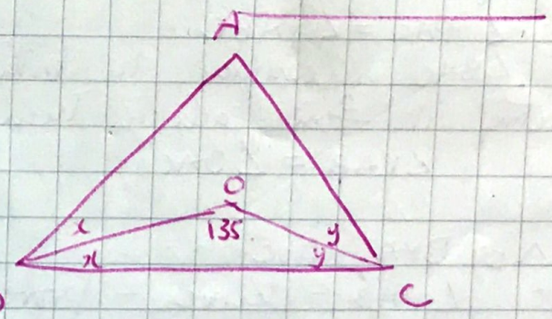
(8)



∴ Construct a Δ of side 2", 2.5", 3".

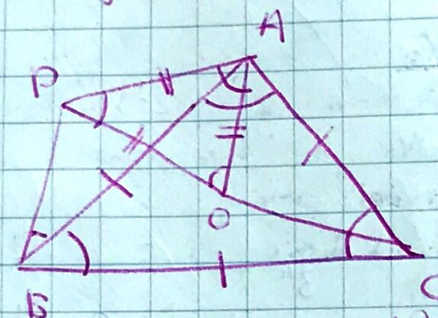
Method: Draw a line any length. Mark off AB = 3"
With centres A & B, make arcs of 2" and 2·5" to intersect at C join AC, ~~AB~~ CB
Then ∠ACB is req'd Δ.

(9)



Given: a Δ ABC with BO, CO bisectors of ∠s ABC, ACB meeting internally at O
∠ BCC = 135.

Geometry Construction 16-XI-54



Given: an equil $\triangle ABC$, with O any inside the $\triangle$ APO is a second equil $\triangle$ such that O and P are on opp sides of AB

To Prove: BP = OC

Con: Join PB, OC

Proof: As the $\triangle$s are equilateral, all $\angle$s are equal.

$\therefore \angle PAO = \angle ABC$

$\therefore$ as $\angle BAC$ is common to both $\angle PAO$, $\angle ABC$

By subtracting it from each in turn,

$\angle PAB = \angle OAC$

$\therefore$ In $\triangle$s BPA, AOC,

$\angle PAB = \angle OAC$ - proved

AP = AO - given (sides of equil $\triangle$)

AB = AC - given ($\therefore$ " ")

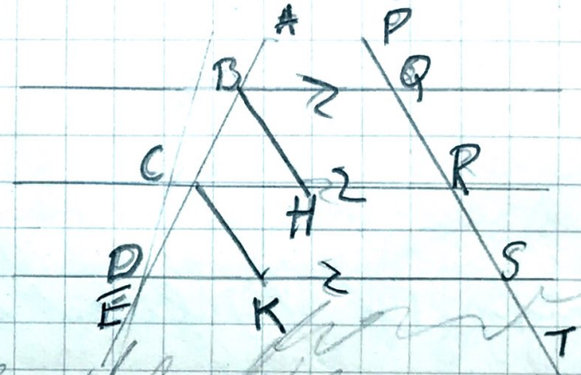
$\therefore$ the $\triangle$s are congruent SAS

$\therefore PB = OC$

QED

The 22

If there are three or more // str lines and if the intercepts made by them on any str line cutting them are =, then the intercepts made by them on any other str line that cuts them are =



Given: three // lines cutting a line AE at B, C, D, and any other line PT at Q, R, S, BC = CD

To prove QR = RS

Cons Draw BH, CK // to PT to meet CR, DS at H and K.

Proof: In $\triangle$s BCH, CDK

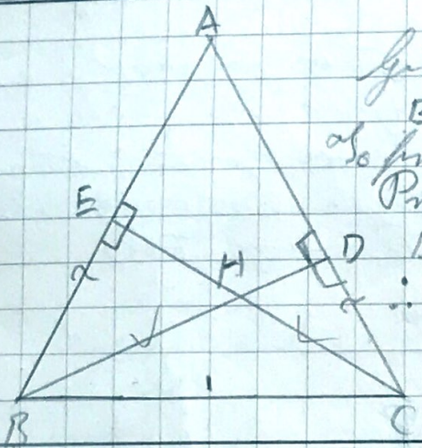
$\angle CBH = \angle DCK$ - corr $\angle$s

$\angle BCH = \angle CDK$ - corr $\angle$s BC = CD - given

$\therefore$ the $\triangle$s are $\equiv$ ASA

$\therefore BH = CK$

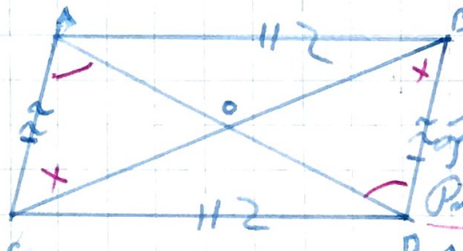
But as RQ



Given a △ ABC with altitudes BD and CE meet at H.
To prove AB = AC
Proof as ∠HBD = ∠HCE then BHD = CHE and EH = DH

Q1 The 22 D
D3 P. that the diags of ∥m bisect each other.
D3 P. that a quad is a ∥ if its diags bisect each other.
D4 P. that the str line joining mid pts of two sides of a △ is ∥ to 3rd side and = ½ the third side. 3 and 210 Qs
5 Cons a △ of sides 3·2 5 4 measure by protractor the size of its ∠s.
6 Draw a measured ∠ABC = 48° copy ∠xyz by cons only.
7 In △ ABC, AB = AC, D is a point on AC such that DB = BC Prove ∠DBC = ∠BAC.
8 In △ ABC ∠BAC = 115 ∠BCA = 20° AD is ⊥r from A to BC prove AD = DB

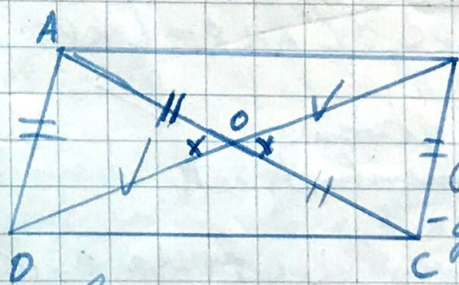
2 Prove that the diags of ∥ bisect each other.



Given: a ∥m ABCD with the diags cutting at O.
To prove: AO = OC, BO = OD.
Proof: In △s AOD = BOC,
DAO = BC off sides of a ∥m
∠AOD = ∠OBD alt ∠s
∠DAO = ∠OCB alt. ∠s
∴ △s are congruent AO = OC A.S.A.
AS1
∴ OC = OB and OA = OD
Q.E.D.

6/0

3 Prove that a quad is a ∥m if its diags bisect each other



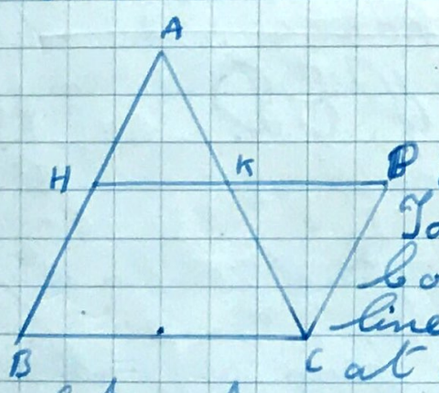
Given a quad ABCD with diags AC, DB bisecting at O.
To prove ABCD is a ∥m
Proof in △ AOB, BOC, AOD, COD
- given DO, OB - given ∠AOD = ∠BOC vertically opp ∠s.
∴ the △s are congruent S.A.S.
∴ AD = BC, and ∠DAC = ∠BCA these are alt ∠s

Geometry. 17/11/54

9/10

on AC ∴ AD // BC.
∴ ABCD is a //m having 1 pair of = & // sides.
Q.E.D.

4 Prove that the str line joining the mid pts of two sides of a Δ is // to the 3rd side = ½ the 3rd side.



Given a Δ with H K mid pts of A B and A C respectively.
To prove H K // B C and = ½ B C,
Cons Thro C draw a line // to A B to meet H K prod at P.
Proof In Δs A H K, K P C, ∠ A H K = ∠ K P C alt ∠s
∠ H A K = ∠ K C P alt ∠s
A K = K C - given
∴ The Δs are congruent A S A
∴ C P = A H and H K = K P,
but A H = H B - given ∴ C P = A H.
But C P // H B - cons
∴ H P C B is a //m having 1 pair of opp sides

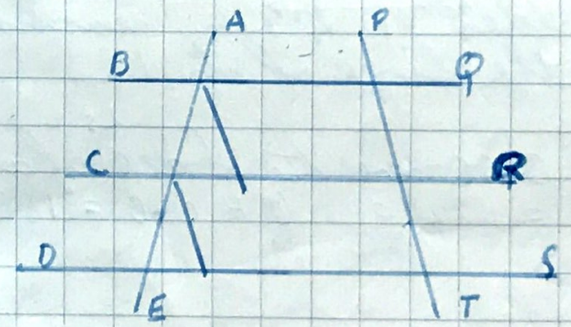
Geometry. 18/1/54

9/6

= & //).
4. ∴ H K // B C, but H K = K P - proved
∴ H K = ½ H P but H P = B C opp sides of //m
∴ H K = ½ B C. Q.E.D. Untidy.

Theorem II

I If there are three or more // str lines and if the intercepts made by them on any str line cutting them are = then the intercept made by them on any other str line that cuts them are =



Given 3 // lines cutting a line A E at B C & D & any other line P T, Q R, S. B C = C D.
To prove Q R = R S.
Cons: draw B H, C K // P T to meet C R D S at H and K.

Geometry. 18/11/54

Proof In Δs BCH, CDK,
∠CBH = ∠CDK – corr ∠s
BC = CD – given
∴ the Δs are congruent A S A
∴ BH = CK. ∎
But as BQ // HR and BH // QR, BQRH is a //m
(having 2 opp pairs of sides)
∴ BH = QR.
and by similar reasoning ∠RSK is a //m
∴ CK = RS – opp sides //m
∴ BH = CK – proved
∴ RS = QR Q.E.D.

9/10

5. Cons a Δ of sides 3·2 4·5 4 measure by protractor the size of its ∠s.

Method Centres B & C are the base ∠s of a Δ
3·2 4 = ∠ABC = 120 ∠ACB = 134
and ∠BAC = 13

9l
101
11
09

Geometry. 22/11/54

Rubbish

THE angles of Δ = 180

60
45
18

You have made them come to 264°.

60
120
45
134
A
B
C

Draw a measured ∠ABC = 48° copy ∠xyz by cons only.

To cons: a ∠xyz = to a given ∠AOC

Method. Draw a line xy any length; ~~length~~

A
E
48°
B
F
C

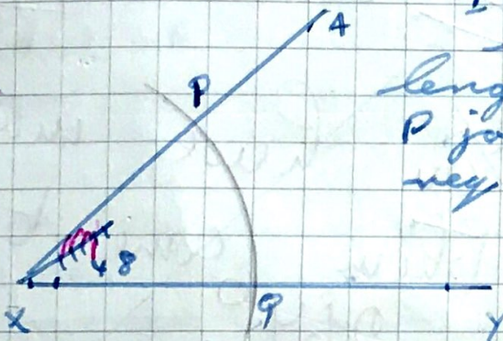
centres B make arc to cut AB, BC at EF respectively.

I Centre X mark off XQ
Centre Q make arc length FE to cut arc at P join XP then ∠PXQ is req ∠.

Q.E.D.

Fail

41/50



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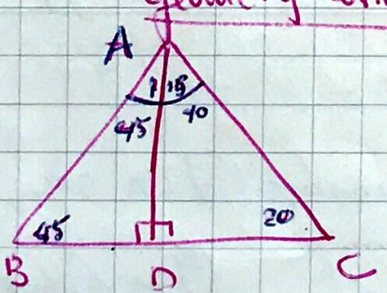
Geometry Correction 23-x1-54

(8)



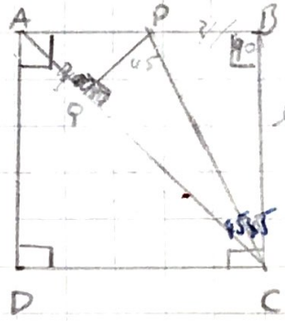
Given: a △ ABC, with ∠BAC = 115°, ∠BCA = 20.
AD is ⊥ from A on to BC at D.

To Prove: ~~∠DBC = ∠DAC~~ AD = DB

Proof: In △ ADC,
∠ADC = 90° - given ⊥
∠ACD = 20° - given
∠DAC = 180 - 110 = 170° - by subtraction

Geometry 24/11/54

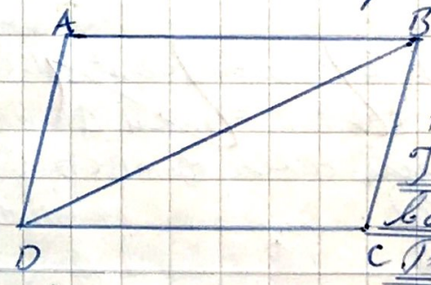
Given a sqr ABCD with AB, BC, CD, DA all are =.
To prove AQ = DB
Cons prod a bisector of ∠BCA cuts AB at P, PQ is ⊥ from P on to AC.
Proof PCQ = 45° ∴ BCP must



90
45
135

Homework starts her 25/11/54

3 Prove that a quad is a //m if its opp sides are =

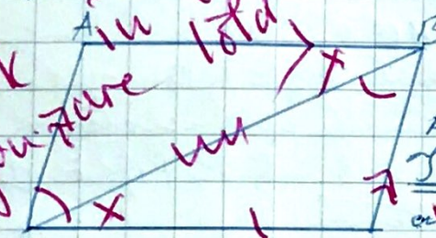


Given a quad ABCD with AB = DC, and AD = BC.
To prove ABCD is a //m.
Cons join BD.
Proof in △s ABD, DBC, AB = DC - given AD = BC - given DB is common = cons.
∴ the △s are congruent SSS
∴ ∠ABD = ∠DBC these are alt ∠s on BD
∴ AB // DC ∴ ABCD is a //m having 1 pair opp = and // sides

Q.E.D.

Geometry 25/11/54

1. Prove that the diagonal of a ∥m bisects its area



Mark your figure all in red

Given a ∥m ABCD, with AD ∥ BC and AB ∥ DC.

To prove (1) ∠BAD = ∠BCD, AD = BC and AB = DC (2) BD bisects the area of ABCD

Cons join BD.

Proof in Δs DAB, DCB, (1) DB is common, (2) ∠ADB = ∠CBD alt ∠s, (3) ∠ABD = ∠BDC alt ∠s.

∴ the Δs are congruent A§A

∴ ∠BAD = ∠BCD

AD = BC

AB = DC

∴ a Δ ABD congruent Δ BCD

area Δ ABD = area Δ

∴ BD bisects area of ABCD

QED

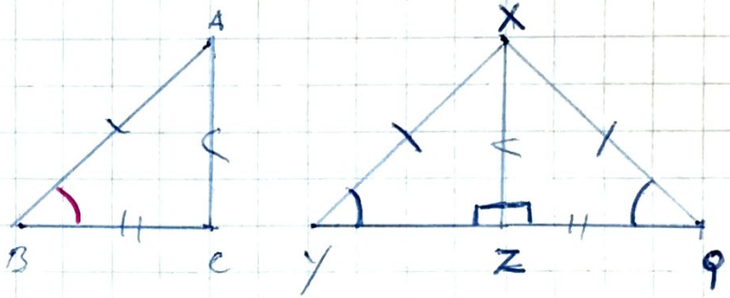
6/10

SET OUT BENEATH EACH OTHER

2. Prove that right ∠d Δs are = if the Hypot and a side, for one, are respectively = to the Hypot and a side of each other.

Geometry 25/11/54

2.



Given a rt ∠d Δs ABC, XYZ rt ∠d at Z and XY = AB, YZ = AC.

To prove Δ ABC is congruent to Δ XYZ

Cons prod YZ to any pt Q such that ZQ = BC join XQ.

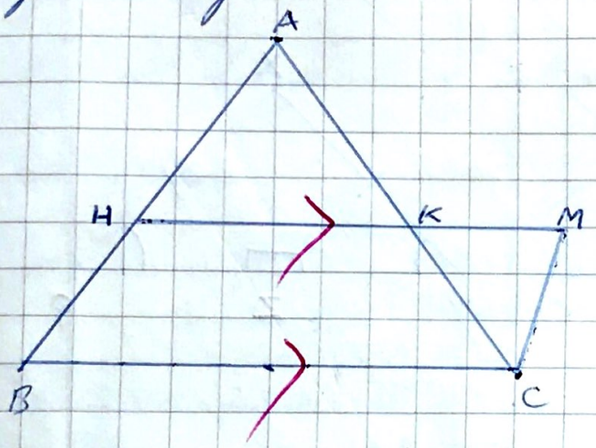
Proof its YZQ is a str line and ∠XYZ = 90 - given ∠XZY Q = 90. In Δs XZQ, ABC ∠XZQ = ∠ACB rt ∠s ZQ = BC - cons YZ = AC given ∴ the Δs are congruent SAS. ∴ ∠XQZ = ∠ABC = ∠XYZ - ∠s opp sides are = ∴ ∠XQZ = ∠ABC. In Δs ABC, XYZ AB = XZ - given ∠XYZ = ∠ABC, ∠ACB = ∠XYZ given rt ∠s

QED

8/10

4. The str line drawn thro the mid pts of one side of a Δ ∥ to the second side, bisects the 3rd

4.



Given a △ ABC with HK drawn thro mid pt of AB at H // to BC at HM.

To prove HK bisects AC.

Cons thro C draw a line // to AB to meet HK prod at M.

Proof ∵ HM // BC = given

and AB // MC – cons.

HMCB is a //m (having 2 opp pairs of sides //)

∴ HB = MC – opp sides

but AH = HB – given H is mid pt.

∴ MC = AH ∴ ∵ in △s MKC, AHK

MC = AH proved

∠ AHK = ∠ KCM alt ∠s

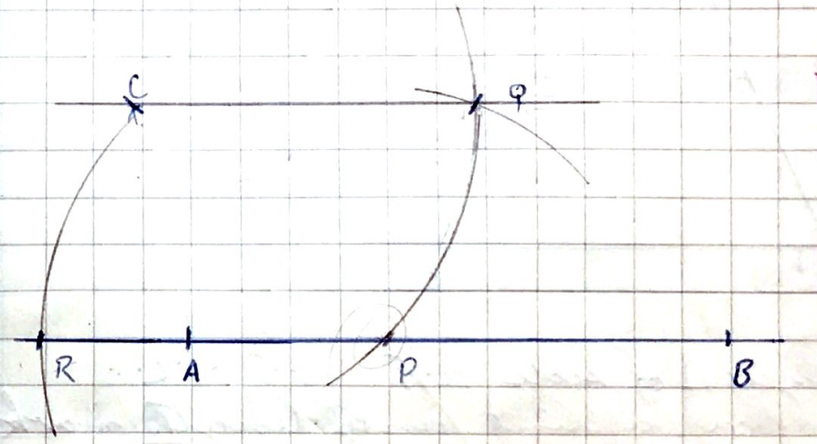
∠ AHK = ∠ KMC alt ∠s

∴ the △s are congruent ASA

∴ AK = KC

Q.E.D.

Cons a line thro a given pt // to a given str line.



Neat

Method. Draw a line AB any length.

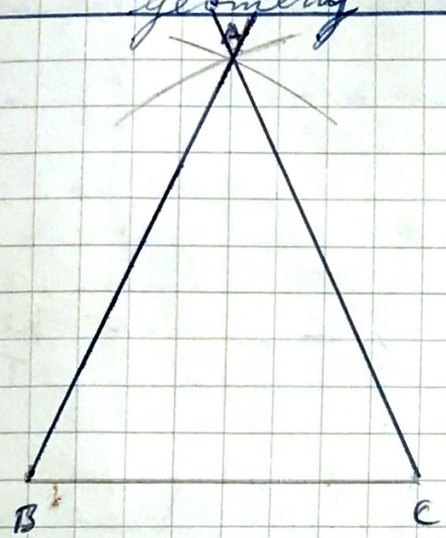
Centre C make arc of ○ PQ to cut AB at P.

radius CP and Centre P, make arc to cut AB at R.

Centre P, radius CR make arc to intersect PQ at Q.

Join CQ and CQ is req // line to AB

Q.E.D.



To cons a Δ of side 2·5 3·5 2·

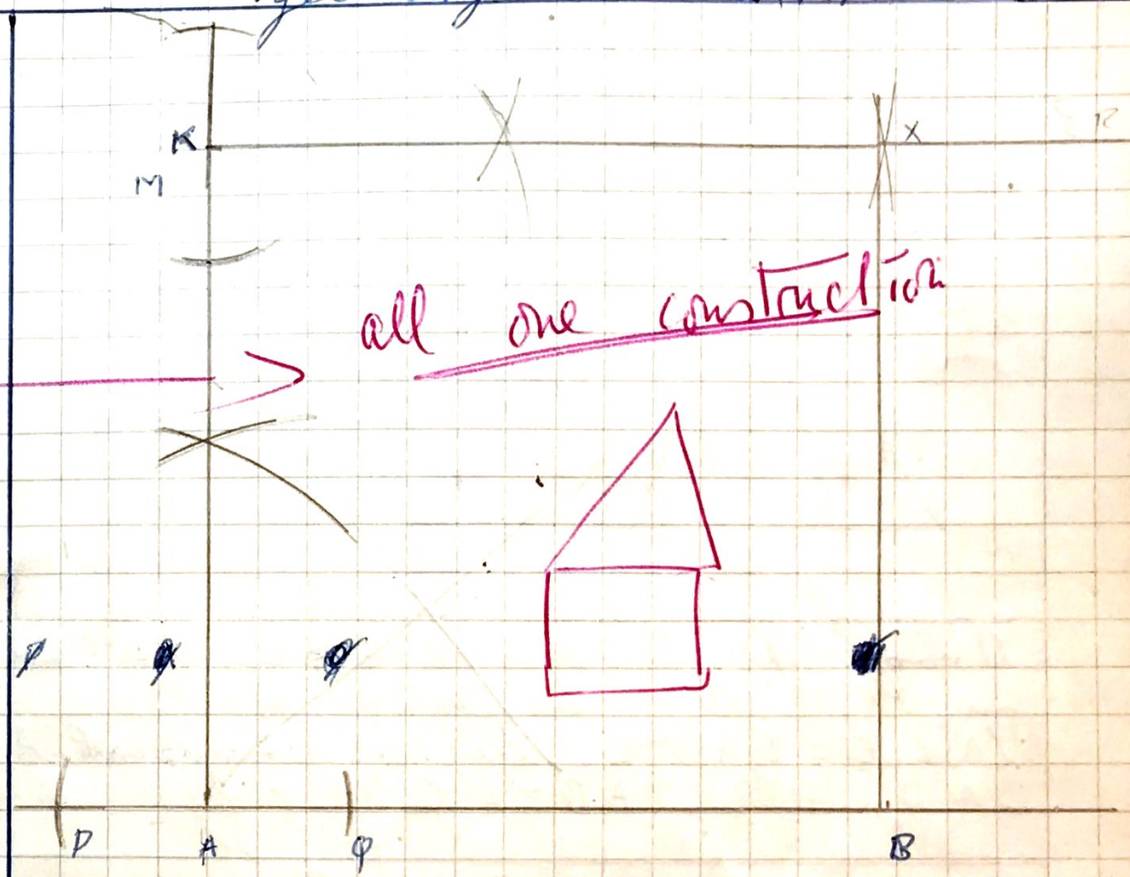
Method Draw a line any length mark off AB=2·5

Centre A & B make arcs of 2·5 and 3·5 to intersect at A join BA CA then BAC is req^{d} Δ.

2/10

6. Cons a sqr on a given str line

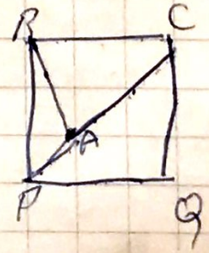
Method Draw a line any length mark off AB. Centre A mark arc to cut AB on either side of A at P,Q. Centres P & Q make arc's X above at M; join AM & prod any length on AM mark off AK = AB.



all one construction

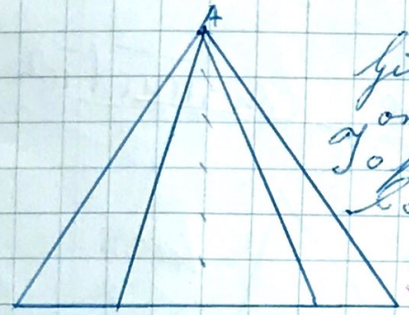
Centres K make arc to cut either sides of K mark arc to intersect & erect ⊥^{r} KR any length, mark off KX = AB: join XB then AKXB is req^{d} sqr.

Q.E.D.



Geometry 29/11/54

8 ABCD is a Δ D, E are pts on BC such that ∠BAD = ∠CAE. If AD = AE prove AB = AC



Given a Δ ABCD, D, E are pts on BC such that ∠BAD = ∠CAE
To prove AB = AC.
Join a line to any pt O and any pt Q.

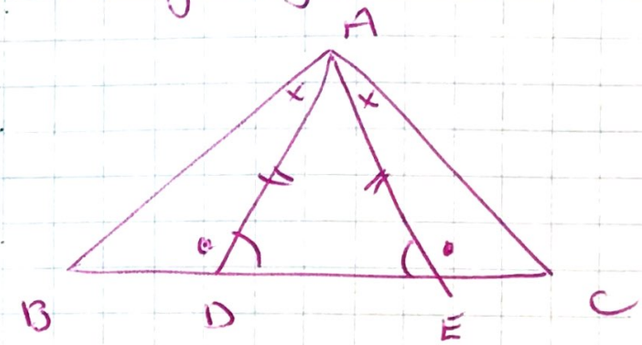
Proof. In ∠s ∠BAD = ∠CAE, D & E are pts on BC ∴ DAE are centre pts.
∴ ∠ACE = ∠ADB ∴ they are congruent ASA
∴ AD = AE. ∴ AB = AC. QED

36/86

Fair

Geometry Corrections. 30-XI-54

8



Given a Δ ABC with D and E pts on BC such that ∠BAD = ∠EAC.
AD = AE.

To Prove: ∠ABD = ∠ACE

Proof: As AD = AE
In Δ ADE, ∠ADE = ∠AED - ∠s opp = sides

∴ As BDEC is a straight line adj ∠s ADB, AEC must be =

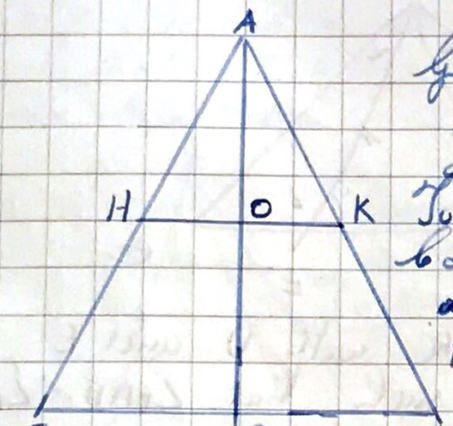
∴ In Δs ADB, AEC

AD = AE — given
∠BAD = ∠EAC — given
∠ADB = ∠AEC — proved
∴ the Δs are congruent ASA

∴ ∠ABD = ∠ACE QED

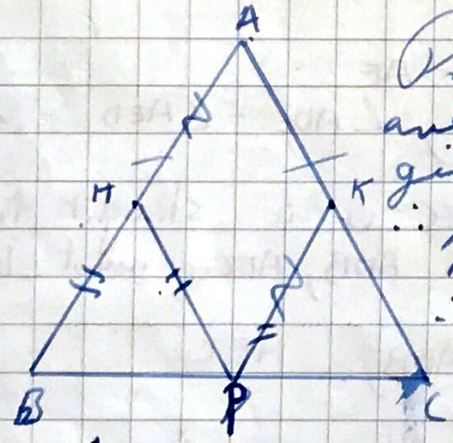
Geometry. 7/12/54

I.

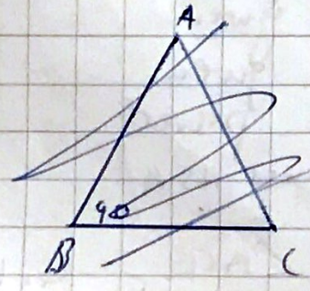


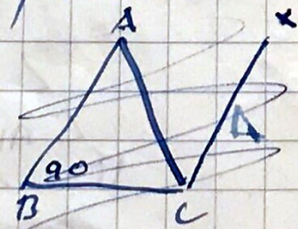
Given a △ ABC, with H & K are mid pts AB, and AC.
To prove HK bisects AP
Join a line for H, K.
Draw a line ⊥ for, to P.
P being any pt on BC.
Proof ∵ ∠AHO = ∠AKO,
∴ ∠ACB = ∠ABC.

2.



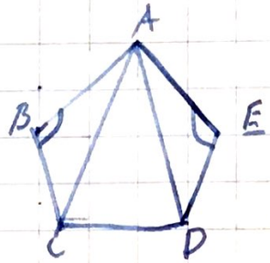
Proof AB = AG, H & K are mid pts on AC, AB = given, P is any pt on BC
∴ join HP & KP makes a // m AHPK.
∴ HP + KP = AB
Q.E.D.



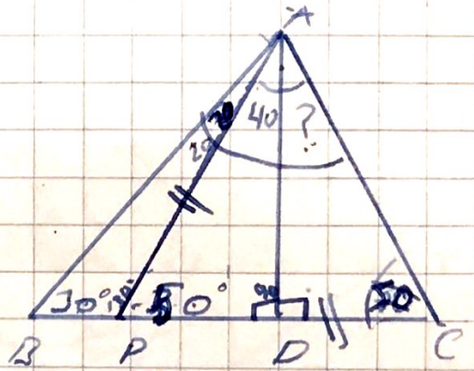


Geometry. /12/54

3.



Given a pentagon ABCDE, in which AB = AE, and BC = ED.
To prove ∠BCD = ∠EDC.
Join a line AD and AC.

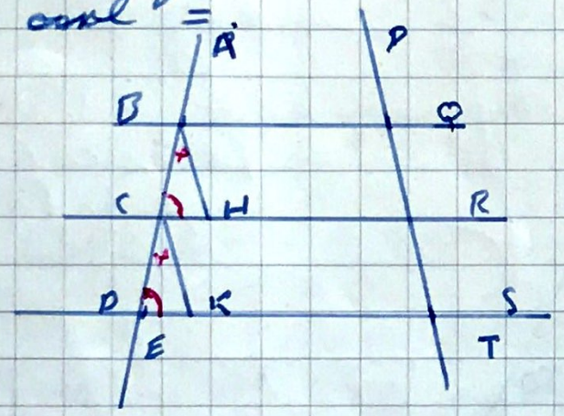


30
50
180

I. Theorem
2. Prove that a quad is a // m if its opp ∠s are =
3. Join a equilateral △ ABC of side 2·5. Thro A cons a line // to BC any length and thro C cons a line // to BA to meet it at X join XB and cons ∠XBC.
4. In △ABC, ∠ABC = 90 BCK is an equilateral △; prove that the line from C // to AB bisects A (intercept Theorem).

I

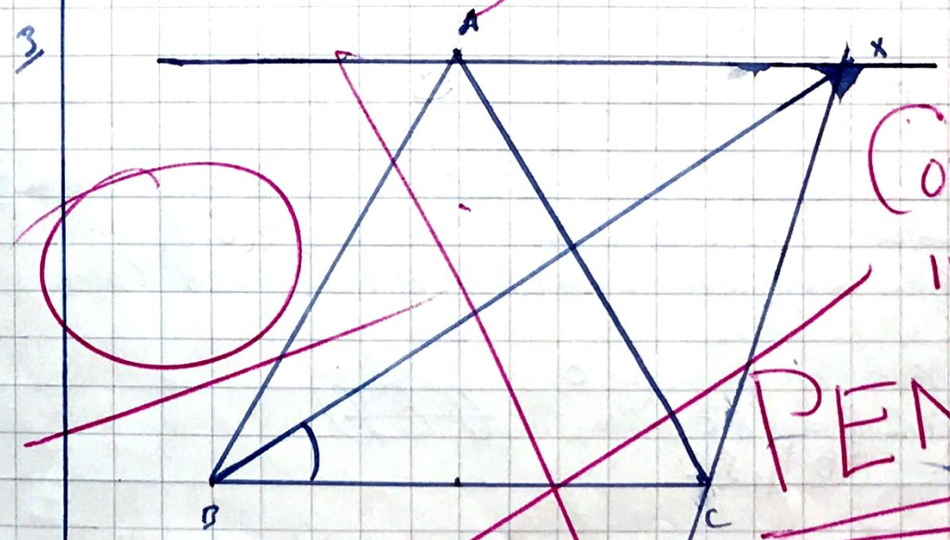
If there are three or more // str lines and if the intercept made by them on any str line cutting them are = then the intercept made by them on any other str line that cuts, then are =



Given 3 // lines cutting a line AE at BC and D and any other line PT, QR, S. BC = CD.
To prove QR = RS.
Construction Draw a line HK // to QR, RS. to meet CD RS at H and K.
Proof In Δs BCH, CDK
∠BCH = ∠CDK = corr. ∠s
∠BHC = ∠DCK corres ∠s
BC = CD - given
∴ the Δs are congruent ASA
∴ BH = QR, and by similar reasoning CRSK is a //m

BQ // HR and BH // QR BQRH is a //m (2/10)
(having 2 pairs of opp sides).
I ∴ BH = CK and BH = QR opp sides //m
∴ CK = RS - opp sides //m
∴ BH = CK - proved.
∴ RS = QR
QED muddle.

3)

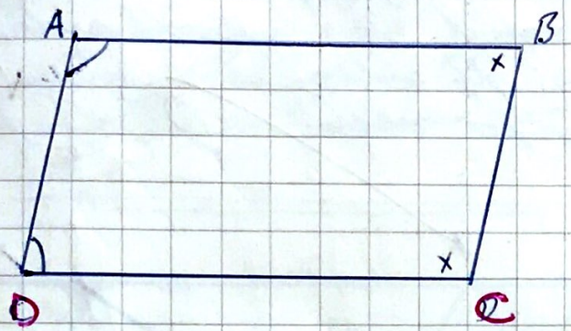


AGAIN
Constructions
in
PENCIL

To construct a Δ of side 2·5.
Method Draw a line // to BC at A. and Draw a line thro C joining at X.
Centres A B make arcs of 2·5, to intersect at A join B A, C A.
Centres X, A are // to B C, and join X C to make a sqr, and join X B to make ∠ X B C. ∴ ∠ X B C is reg ∠

Geometry. 3/12/54

2. Prove that a quad is a //m if its opp ∠s are =



5/10

Given a quad ABCD with ∠A = ∠C and ∠B = ∠D
To prove ABCD is a //m.
Proof in a figure ∠A + ∠B + ∠D + ∠C = 360° But ∠A = ∠C and ∠B = ∠D
∴ 2∠A + 2∠B = 360
∴ ∠A + ∠B = 180
∴ AD || BC

~~Q.E.D.~~

Simᵍ it may be proved that AB || DC
∴ ABCD is a //ᵐ having 2 opp pairs of sides ||

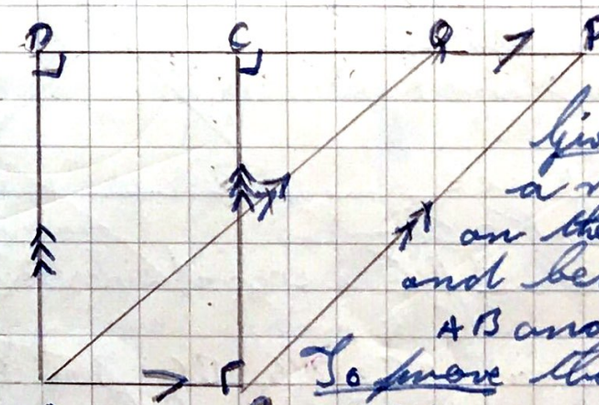
QED

7/40 V. Weak

Borrow Glumsiod's Book, and write out Th. 22. "three times!" before the week-end

Geometry. 26-I-55

The 24 The area of a //m is = to the area of a rectangle standing on the same base, and between the same //s



Given a //m QPBA and a rect DCBA standing on the same base AB and between same //s AB and DCQP

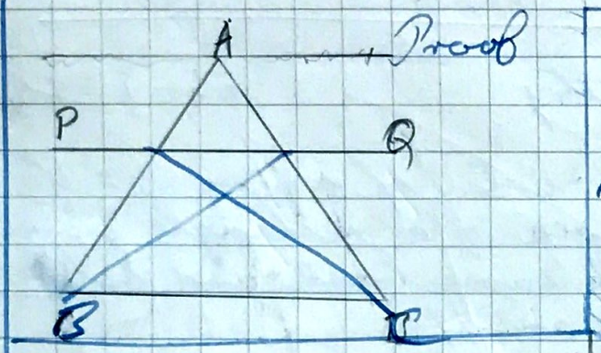
To prove that the area of //m QPBA = area rect DCBA.

Proof In Δs DQA, BCP, ∠AD = CB = opp sides
∠ADC = ∠BCP = corr ∠s
∠DQA = ∠CPB = corr ∠s
∴ the Δs are ≡ ASA ∴ their areas are =
∴ By subtracting each in turn from the whole fig DPBA area of rect DCBA area // QPBA

QED

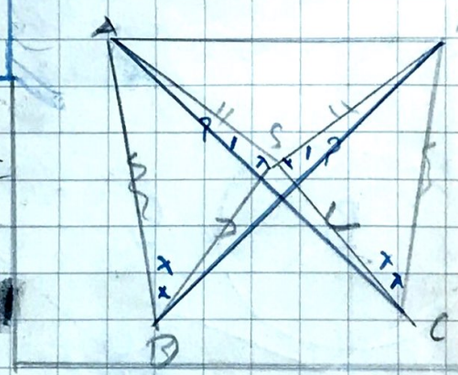
Geometry 26 - I - 55

PROVE APC = area AQB



Proof

In the fig SA = SB
SD = SC AD = BC
PROVE AC = BD

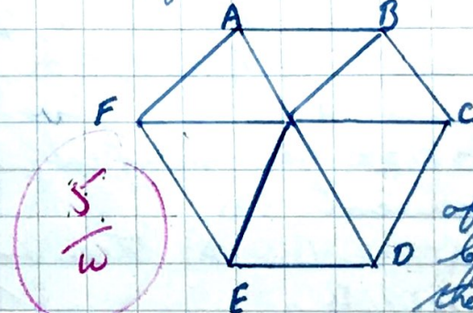


1. That the int Ls of a convex polygon of n sides = 2n - 4 rt Ls.
2. That a quad is a ||m if its diags bisect each other.
3. That the off Ls of ||m are =
4. That the str line drawn thro the mid pt of one side of a Δ || to a second side bisects the 3rd side.
5. Const a Δ ABC with AB = 2·5 BC = 3 and AC = 3·2. Cons a sq BCQP on BC as base join AP and measure APB & CBA.
6. ∠XYZ = 68, cons an ∠ABC to = ∠XYZ, and bisect it by cons.
7. Two lines AOB, COD intersect at O of AC // BD, prove area Δ AOD = area Δ BOC.

2 ABCD is a ||m P is the mid pt of AB, CP and DA are prod to meet at Q; DP and CB are prod to meet at R. Prove QR = CD

24 The

1 Prove that the int Ls of a convex polygon of n side of n = 2n - 4 rt Ls



5/ω

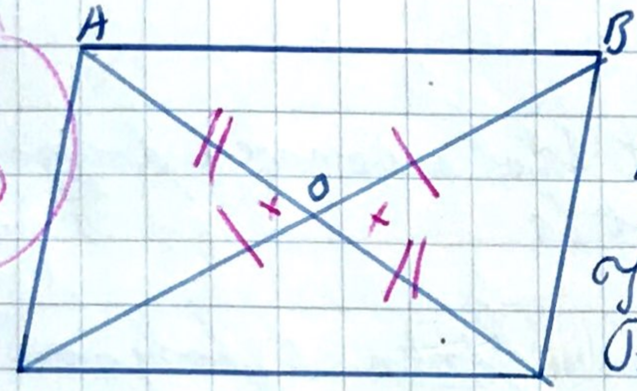
Given. A polygon of n sides ~~= 2n - 4 rt Ls~~.
To prove. That the sum of the int Ls = 2n - 4 rt Ls.
Cons a point O inside the polygon and ~~join~~ join it to vertices to it.

Proof As the polygon has n sides, by connecting the vertices to O we have divided into n Δs the sum of the Ls in a Δ = 2 rt Ls.
But Ls at a pt = 360°
∴ the polygon has 2n ~~-4~~ rt Ls, ~~at 0 = 360°~~ = 4 rt Ls
∴ the int Ls of a polygon of n sides = (2n - 4) rt Ls

Q. E. D.

Geometry 27 January

2. Prove that a quad is a //m if its diags bisect each other.



8/10

Given a //m quad ABCD with diags AC BD, bisecting at O. To prove ABCD is a //m

Proof in Δ AOB, BOC, and AO, OC – given DO, OB – given ∠AOD = ∠BOC vertically opp ∠s ∴ the Δs are congruent SAS

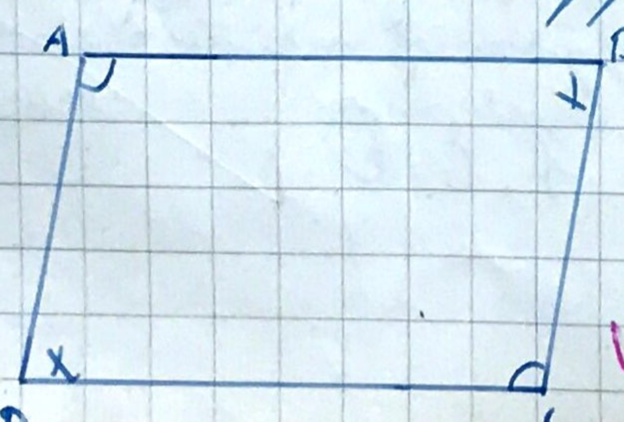
∴ AD = BC, and ∠DAC = ∠BCA these are alt ∠s on AC ∴ AD // BC

∴ ABCD is a //m having 1 pair of = and // sides

Q.E.D.

Untidy!

3. Prove that the opp ∠s of a //m are =



13/90

V weak

Where is the rest of your homework !!!

Algebra 25/11/54

£240. £320 for 2 yrs @ 4¼

4/100 1/400

320.0000
4
(100) 1280.0000
8.0000
.8000
13.6000

13.6000
320.0000
333.6000
4
100) 1334.4000

Algebra Homework. 25/11/54

5 I Arith

1. Find the S I on £460 5/4 for 2 yrs @ 3¼
3. Find the C I on £240 for 3 yrs @ 2
3. Find the C I on £370 for 3 years @ 3 ½ / 4 2 ¼
4. Solve $\frac{x-3}{x-4} = \frac{x+12}{x+8}$
5. Find rt of eqn $2x^2 + 3x - 4 = 0$ corr to 2 places of dec
6. How far can a bird fly in x hours at the rate of 2 miles in 7 minutes.
7. A sqr field is bounded by path 3 yds wide. The field and the path together cover 2½ acres. Find the cost of covering the path with growth @ 1/6d per sq. yd
8. Simplify I $\frac{2a}{3} + \frac{4a}{9b}$ 9 II $\frac{3x-1}{4} (x+3)/6 + \frac{2x-1}{3}$

LCM 24

Alan Richard Allen

Algebra. 26/11/54

5. $2x^2 + 3x - 4 = 0$ $a = 2$ $b = +3$ $c = -4$

$x = -b \pm \sqrt{\dfrac{b^2 - 4ac}{2a}}$

$x = -3 \pm \sqrt{\dfrac{9 + 32}{4a}}$

$x = -3 \pm \sqrt{\dfrac{41}{4}}$

$x = -3 \pm \dfrac{(5.74)}{4}$ or $x = -4 - \dfrac{(+5.74)}{4}$

$x = -3 \pm \dfrac{1.74}{4}$ or $+\dfrac{9.74}{4}$

$x = \dfrac{0.43}{4}$ or $\dfrac{2.43}{4}$ Answer

(in red: $-4 \; 2 \; -4$, $-8 \cdot -4 = +32$; mark: 3/10)

II

8 $\dfrac{(3x-1)}{4}\dfrac{(x+3)}{6} + \dfrac{(2x-1)}{3}$

L.C.M. 12 $\dfrac{3(3x-1)2(x+3)4(2x-1)}{12}$

Algebra, 28/11/54

$+\dfrac{6x - 3 + 2x + 6 + 8x - 4}{12}$

$\dfrac{(x-3)}{12}$ Answer

(mark: 2/10)

I

460	1	6
		3
1381	2	6
		2
2762	5	0

£ 29 - 16 - 0 Answer

100)276250(27£
200
762
700
62
20
00

100)12455(124
100
245
200
45

45
12
90
45
100)540(54
500
400
400
...

Algebra 28/11/54

2. C.I. £240 3 years at 2%

1st year 2% 4·8

2nd 2% 244·8 / 4·896 / 249·696

3rd 2% / 4·99392

£254·68992 Answer

£254·68992 Answer

3. 1st 3½% = 46·0

2nd 5·66

3rd 3½% 769·66 / 7·69 / 776·35 / 370

£406·35 Answer

£406·35 Answer

USELESS

8/100

4. I $x^2 + a + 2ax - y^2$

$= x^2 + 2ax + a - y^2$

$= (x+a)(x+a) - y^2$

$= (x+a)^2 - y^2$

$= [(x+a) - y][(x+a) + y]$

$= [x + a - y][x + a + y]$ Answer

Good

3/10

Algebra 2/12/54

4. $[(m+n+p)^2 - (m-n-p)^2]$

$[(m+n+p)] - [(m-n-p)]$

$[m+n+p] - [m+n+p]$

$m^2 + n^2 + p^2$ Answer

WHERE ARE LAST WEEKS CORRECTIONS ??

Arithmetic & Algebra Corrections 30-XI-54

(1)(a) $\frac{2a}{3} + \frac{4a}{9b}$ LCM = 9b

$\frac{3b(2a) + 4a}{9b} = \frac{6ab + 4a}{9b}$

$= \frac{2a(3b+2)}{9b}$ Answer

(b) $\frac{(3x-1)}{4} + \frac{(x+3)}{6} + \frac{(2x-1)}{3}$

LCM = 12

$\frac{3(3x-1) + 2(x+3) + 4(2x-1)}{12}$

$\frac{9x - 3 + 2x + 6 + 8x - 4}{12} = \frac{19x - 1}{12}$ Answ

(2) $\frac{(x-3)}{(x-4)} = \frac{(x+12)}{(x+8)}$

LCM $= (x-4)(x+8)$

$(x-3)(x+8) = (x+12)(x-4)$

$x^2 + 5x - 24 = x^2 + 8x - 48$

$-3x = -24$

$x = 8$ Answer

(3) $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $\quad a = 2,\ b = 3,\ c = -4$

$x = \frac{-3 \pm \sqrt{9 + 32}}{4}$

$x = \frac{-3 \pm \sqrt{41}}{4}$

$x = \frac{-3 \pm (6.41)}{4}$

$x = \frac{-9.41}{4}$ or $\frac{3.41}{4}$ $\therefore x = -2.35$ or 0.85 } Answer.

41.00 | 6.409
36
124 | 500
496
1289 | 40000
11601

(4) (a) $(m+n+p)^2 - (m-n-p)^2$

$= [(m+n+p) - (m-n-p)][(m+n+p) + (m-n-p)]$

$= [m+n+p-m+n+p][m+n+p+m-n-p]$

$= [2n+2p][2m]$

(b) $(a+b)^3 + 1$

$= (a+b)^3 + 1^3$

$= [(a+b)+1][(a+b)^2 - (a+b) + 1^2]$ Ans.

(5) Bird travels 2 miles in 7 min

$\therefore$ in 1 minute he travels $\frac{2}{7}$ miles

$\therefore$ in $60x$ mins he $\frac{2 \cdot 60x}{7}$

$= \frac{120x}{7}$ Ans

36

Arithmetic Corrections 30-XI-54

(1) 51.

$$= \frac{£460 \cdot 7 \cdot 6 \times 2 \times 13}{100 \times 4}$$

230 . 3 . 9 £46 . 0 . 9 £11 . 10 . 2¾

= £11 . 10 . 2¾
× 13

5) 149 . 12 . 5 ¼
29 . 18 . 5¾ Answer

5984
11
5995

(2). Borrow Glasscocks Book & write out q's 2, 3 and 4 in FULL

13 14
13 14
26 28

2 × 11 = 22
2 × 12
24

Algebra 2/12/54

$$\sqrt{\frac{46 \times (4.14)^2}{(3.27)^3}}$$

No	log	Log
46	2.2981	1.1495
$(4.14)^2$	2(0.5176)	3.0352
		4.1821
$(3.27)^3$	3(0.2123)	0.0407

4.1821
0.0107
4.2534

No	log	Log
46	0.6628 / 2	0.3314
$(4.14)^2$	2(0.8531)	0.6171
		0.9472
$(3.27)^3$	3(0.5145)	0.1715

0.94728
0.1715
0.77578

Ante. 5995

$$\frac{349 \times (4.063)^{2/3} \times \sqrt{48.1}}{(77.4)^{1/4} \times \sqrt[3]{31.8}}$$

Algebra 6/12/54

No	log	log
3·79	0·5786	0·2893
(4·063)²	2	
	0·6652	0·3328
3/0·81	2·6821	0·0990
	3	1·4861
71·4	2·	

1·4861

Algebra Homework 2/12/54

Evaluate by logs

1 I $\frac{\sqrt[3]{339 \times (2.41)^2}}{(31.28)^{\frac{1}{3}}}$ II $\frac{(0.641)^3}{(0.142)^2}$

146 / 16.4 / 240

3. Find the roots of the eqn $6x^2 + 8x - 9 = 0$

3 Factorise.

I $pq + qR + pr - r^2$

II $2y^2 + xy$

III $4m^2 + n^2 - q^2 + 4mn$

4. Solve.

$7x - 6y = 25$ ①

$5x + 4y = 51$ ②

$x = 7 \quad y = 3$

Algebra 6/12/54

I I $\frac{\sqrt[3]{339 \times (2.41)^2}}{(31.28)^{\frac{1}{3}}}$ W/W V. Good.

1·6074

0·4984

1·1090 = 12·85 Answer

12·85 Answer

No	log	log
$\sqrt[3]{339}$	$0.5\frac{3}{3}0\frac{3}{2}$	0·1766
	3	
$(2.41)^2$	0·3820	0·7640
	1	1·6074
No	log	log
$(31.28)^{\frac{1}{3}}$	1·4953	0·4984

II N. $\frac{(0.641)^3}{(0.142)^2}$ $\frac{(0.641)^3}{(0.142)^2}$

3/10

22·65 Answer

log	log
$0.8\frac{2}{3}0\frac{2}{3}9$	0·2689
$2(0.1523)$	0·0461
	0·3450

See corrections!

$6x^2 + 8x - 9 = 0$

$ax^2 + bx + c = 0$

$4x^2 + 8x - 9 = 0$

$\therefore a = 4 \quad b = 8 \quad c = -9$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-8 \pm \sqrt{64 - 144}}{8}$

$= \frac{-8 \pm \sqrt{208}}{8}$ ✓

Algebra 6/11/54

3. 2 0 8 | 14.4222

1
1 0 8
9 6
1 2 0 0
1 1 3 6
6 4 0 0
5 1 6 4
6 3 6 0 0
5 1 6 8 4
5 9 1 6

24, 284, 2882, 28842

8/10

3.

I. $pq + qR - pR - R^2$

$pq + R^4(q - p)$

$x^4(2q - 2p)$ Answer ✗

II. $27 + x^3$

$[3x + x][3x + 3x + x]$ Answer ✗

III. $4mn^2 + n^2q^2 + 4mn$

$8(m^3 + n^3) - q^7$

$8m^3 + 8n^3 - q^7$ Answer ✗

2/10

See correction

2 (cont)

$x = \frac{-8 \pm 14.42}{8}$

$x = \frac{6.42}{8}$ or $\frac{-22.42}{8}$

$x = \frac{0.80}{8}$ or $\frac{-2.80}{8}$

~~$x = \frac{1.30}{8}$ or $\frac{-2.30}{8}$ Answer~~

$\therefore x = 0.80$ or -2.80 Ans

Algebra 6/11/54

147

$6 \times 25 = 150$

4. $7x - 6y = 25$ ①
$5x + 4y = 51$ ②

(1) × 4 $28x - 24y = 100$ ③
(2) × 6 $30x - 24y = 306$ ④
$58x = 406$
$= 7$

Subs in 1 = $7x - 6y = 25$
$5x + 4y = 51$
$49 - 25 = 24$
$\therefore 6y = 24$
$\therefore y = 4$

Check in 2 $5x + 4y = 51 = LHS$
$35 + 16 = 51 = RHS$

$\therefore x = 7$
$y = 4$ Answer

10/10

Good

9 Fair

33/80

(Better effort!)

Alan Richard

$51 = rhs$

$\therefore x = 7$

$y = 4$

(1) (ii) $\frac{(0.641)^3}{(0.142)^2}$

No.	Log	Log
$(0.641)^3$	$3(\bar{1}.8048)$	$\bar{1}.4207$
$(0.142)^2$	$2(\bar{1}.1523)$	-2.3046
		1.1161

Anti. Log = 13.07 Ans

$-1-(-2)$
$= -1+2$
$= +1$

(3) (i) $pq + qr - pr - r^2 \quad q - x^2$

$q(p+r) - r(p+r) = (3+x)(3^2 - 2x + x^2)$ Ans

$= (q-r)(p+r)$ Ans

(ii) $27 + x^3$

$= (3+x)(3^2 - 3x + x^2)$ Ans.

(iii) $4m^2 + n^2 - q^2 + 4mn.$

rearrange $= (4m^2 + 4mn + n^2) - q^2$

$= (2m+n)(2m+n) - q^2$

$= (2m+n)^2 - q^2$

$= [(2m+n) - q][(2m+n) + q) = [2m+n-q][2m+n+q]$ Ans

(5) $\pounds x, y, z$

$= 240x^d + 12y^d + z^q$

$- 252xyz^d$ Ans.

(6) Area of field $= 165 \times 88 = 14520$ sq yds

$\therefore = \frac{14520}{4840}$ acres $= \frac{3}{1}$ acres $= 3$ acres

$\therefore$ cost @ 25/- per acre $= 75/-$

$= \pounds 3 - 15 - 0$ Ans

(7)

£ 334 . 0000		1st prin.
6 . 6800		int @ 2%
1 . 6700		int @ ½%
£ 342 . 3500		2nd prin.
6 . 8470		int @ 2%
1 . 7118		int @ ½%
£ 350 . 9088		3rd prin.
7 . 0182		int @ 2%
1 . 7545		
£ 358 . 6815		4th prin.
£ 334 . 0000		
£ . 25 . $\frac{6815}{10000}$	=	£ 25 / 13 / 7½ Answer.

Algebra 9/12/54

1. Find the C.I. and S.I. on £4882 for 3 years @ 3½ %

2. Evaluate by logs

$\dfrac{(270)^2 \times \sqrt[3]{66.1}}{(84.62)^{1/2}}$ $\dfrac{(3.429)^2}{(3.621)^3}$

2/10

2. $\dfrac{(270)^2 \times \sqrt[3]{661}}{(84.62)^{1/2}}$

No.	log	log
$(270)^2$	0.4314	0.8628
$\sqrt[3]{661}$	2.8202 / 3	0.9400
		1.8028
$(84.62)^{1/2}$	2.9275 / 2	1.4637

1.8028
1.4637
0.3391

21.83 Answer

$\dfrac{(3.429)^2}{(3.621)^3}$

No.	log	log
$(3.429)^2$	2(0.5351	1.0702
$(3.621)^3$	3(0.5588	1.6764

1.8782
1.6764
0.3938

2.479 Answer

Exercise 114. 25/1/55

Simple Interest.

1. £ 533 - 6 - 8 (s d) / 100 for 73 days at 3 %

$\dfrac{3}{100} \times \dfrac{73}{365}$ 533 - 6 - 8 = 533⅓ $\times \dfrac{3}{100} \times \dfrac{73}{365}$

$\dfrac{1600}{3} \times \dfrac{3}{100} \times \dfrac{73}{365}$

16
73
1120
48
1168

365) 1168 (£3 = 4
1095
73
20
1460
1460
. . .

Bad figures

£3 .. 4s Answer

3. £ 2160 - 12 - 6 for 1yr 73 days at 5%

= 2160⅝

8457
17285 / 8 × 1/20 (10) × 438 (219, 3) / 365 (73)

10371 / 80

Ex 114. 25/1/55

2 80)10341(£129 .. 12 .. 9

80
237
160
771
720
51
20
80)1020(12
80
220
160
60
12
80)720(9
720
...

Answer £129 .. 12 .. 9

Badly set out
Rule neatly.
Neat figures.

H.

3. £130 from March 5th to November 7th at 3⅓%.

$\frac{130}{1} \times \frac{3\frac{1}{3}}{100} \times \frac{219}{365} = \frac{2847}{1095}$

219 × 13 = 2190 + 657 = 2847

Ex 114. 25/1/55

3. 1095)2847(£2 = 1 2

2190
-657
20
13140
1095
-2190
:2190
.....

Answer £2 .. 12

£243 .. 6 .. 8d from May 15th to November 1st at 3¾%

$\frac{243 \cdot 6 \cdot 8}{100}$

$\frac{196}{40}$

40)176(£4 .. 8
160
16

£4 .. 8s Answer

$= £243\frac{1}{3} \times \frac{3\frac{1}{4}}{100} \times \frac{196}{365}$

$\frac{730}{3} \times \frac{3\frac{1}{4}}{100} \times \frac{196}{365}$

$\frac{73}{8} \times \frac{13}{40} \times \frac{196}{365}$
5

Algebra 27th January

1. Find the roots of eqns.
$4x^2 - 9x + 3 = 0$
corr to 2 sig figs

2. Solve
I $14x + 13y = 35$ } 1
$21x + 19y = 56$ } 2

II $\frac{3}{(5x-9)} = \frac{1}{(10x-10)}$

3. Simplify
$\frac{3b}{(b+1)^2} - \frac{2}{(b+1)}$

4. Evaluate
$2.48 \times \sqrt{2.46}$

II $\frac{(0.312)^3}{(0.143)^4}$

5. Find the CI and SI on £532-10-0 for 2 years at 3½

6. Find the square root of 713.4468

7. Factorise
I $a^4 + a^2$
II $(a+2b)^2 - c^2$
III $(a+b)^3 + 1$

8. What is the ~~loss~~ per cent

Algebra 31st January

1. $4x^2 - 9x + 3 = 0$ $\quad a = 4,\ b = 9,\ c = +3$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-9 \pm \sqrt{81 - 48}}{8}$

$x = \frac{-9 \pm \sqrt{33}}{8}$ $\quad \sqrt{33} = 5.744$ etc

$x = \frac{-9 + (8.12)}{8}$ or $x = \frac{-9 - (8.12)}{8}$

Algebra 31st January

1. $x + \frac{17.132}{8}$ or $\frac{1.132}{8}$

2.14 } Answer
or 0.14 }

~~2.14 } Answer~~
~~or 0.14 }~~

4. Evaluate

$\frac{2.48 \times \sqrt{2.46}}{1.34}$

$\frac{3}{5}$

0.5899
0.1271
0.4628

No	log	log
2.48	0.3945	0.3945
√2.46	(0.3909) / 2	0.1954
		0.5899
1.34	0.1271	0.1271

Anti log $\frac{2.403}{253}$ Answer

9. II $(a+2b)^2 - c^2 = [(a+2b)+c][(a+2b)-c]$

$[(a+2b)][(a+2b-c)] = [a+2b+c][a+2b-c]$

$[a+2b][a+2b-c]$

$a^2 + 4b + c$ Answer

5. S.I.

£532 - 10 × 2 × $\frac{7}{100}$

= 532½ × 2 × $\frac{7}{100}$

$\frac{1065}{2}$ × $\frac{2}{1}$ × $\frac{7}{200}$ = $\frac{213 \times 7}{40}$ on 2 yrs

$\frac{213 \times 7}{40}$ = $\frac{1491}{40}$

£37 - 5s - 6d Answer

40)1491 (37
120
291
280
11

= £

10/10

2)532 (266

C.I.

532½ at 3½ = 18 - 12 - 9 on 1st yr

£532 . 10 + £18 . 12 . 9

£541 - 2 - 9 @ 3½

20
11 | 222¾ $\frac{44891}{4}$ × $\frac{7}{200}$

$\frac{314297}{800}$

800)3142.97 (392.896 = £19 - 12.796

3/10

2nd yr £19 - 12 - 9½
1st yr £18 - 12 - 9
38 - 5 - 6½

∴ total in 2 years

~~£38 - 5 - 6½ Answer~~

£37 - 18 - 6. = C.I.

$\frac{21}{100}$

Weak

Date?

Find rt eqn

$4x^2 - 9x + 3 = 0$

$ax^2 + bx + c = 0$

$4x^2 + 9x + 3 = 0$

$a = 4 \quad b = -9 \quad c = 3$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{+9 \pm \sqrt{81 - 48}}{8}$

$x = \frac{+9 \pm \sqrt{33}}{8}$

$x = \frac{9 \pm 5.745}{8}$ or

$x = \frac{14.745}{8}$ or $\frac{4.75}{8}$ [? second value hard to read]

$x = 1.84$ or $\frac{0.59}{8}$ Answer

amazing!

10/10

Date?

$13\overline{)266}$

1. $14x + 13y = 35$
2. $1x + 19y = 56$

$① \times 19 \quad 266x + 247y = 665$

$② \times 13 \quad 273x + 247y = 728$

$7x = 63$

$x = 9$

Subs in ① $14x + 13y = 35$

$\therefore 126 + 13y = 35$

$\therefore 13y = -91$

$y = -7$

$x = 9 \quad y = -7$ Ans

V. Good

10/10

$\frac{(0.312)^3}{(0.143)^4}$

No		Log
$(0.312)^3$	$3(\bar{1}.4942)$	$\bar{1}.4826$
$(0.143)^4$	$4(\bar{1}.1553)$	$\bar{4}.6212$
		$\bar{4}.8614$ Ans

$\bar{1}.8614$ Ans

shattering!

10/10

$\frac{3b}{(b+1)^2} - \frac{2}{(b+1)}$

LCM $(b+1)^2$

$\frac{3b - 2(b+1)}{(b+1)(b+1)}$

$= \frac{3b - 2b - 2}{LCM}$

$= \frac{(b-2)}{(b+1)(b+1)}$ Ans

10/10

Algebra. 10th February

Arith & Algy

1 Find the cost of 4 tns 12 cwt @ 35/- per ton ✓

2 Simplify $(3\frac{2}{3} + 4\frac{3}{5}) \div (8\frac{2}{3} - 3\frac{1}{2})$

3 Find the rate per cent per annum if the SI on £418/6/8 for 2½ yrs is £28/18/4

4 Find the CI on £722 for 3 yrs @ 2½ % ✓

5 Evaluate $\frac{0.00024 \times 0.006 \times (11.36)^2}{\sqrt[3]{0.016}}$ ✓

6 Q 12 set last week

7 Solve $2x - y = 4$, $\frac{x}{2} + \frac{y}{4} = 5$

8 $x^2 + 4$; $a^2 + 2a + 2$; $x^3 - 64x$ ✓

9 Find the sqrt 37.12 2 places of dec. ✓

0531
23
0.5291

$\bar{3}.0024$
$\bar{2}.006$
$\bar{5}.0084$

7664

No	Log	Log
5.0084	$\bar{5}$.7664	$\bar{5}$.7664
$(11.36)^2$	2(1.0554)	$\bar{0}$.5277
		$\bar{1}$.2941
$\sqrt[3]{0.016}$	$\bar{0}$.253 / 3	$\bar{0}$.0014

$\bar{1}$.2441
$\bar{0}$.0014
$\bar{1}$.2455

1760 Answer

Draw a graph of $y = x - 6$ taking values of x from -2 to $+3$

R = 31 100

Arithematic. 17th of February

C.S.

£722 × 2½ % for 3 yrs.

£722 × 2½ %

$\frac{722}{1} \times \frac{2\frac{1}{2}}{100}$

3.61

$\frac{722}{1} \times \frac{5}{200}$ (100)

3.61 × 5 = 18.05 interest on 1st yr

722 × 18.05 @ 2½%

3.70025

$\frac{740.05}{1} \times \frac{5}{200}$ (100) = 18.50125 interest for 2nd yr

$\frac{740.05 \times 18.50125 @ 5}{1 \quad 200}$ (100)

3792.15625

$\frac{758.55125}{1} \times \frac{5}{200}$ (100)

Arithematic, 14th February

18·9 6 3 7 8 1 2 5
758·5 5 1 2 5
777·5 1 5 0 3 1 2 5
2 ϕ
10·3 0 0 6 2 5 0
1 2
3·6 0 7 5 0 0 0

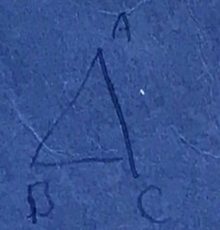
= £777 - 10 - 3½ Answer

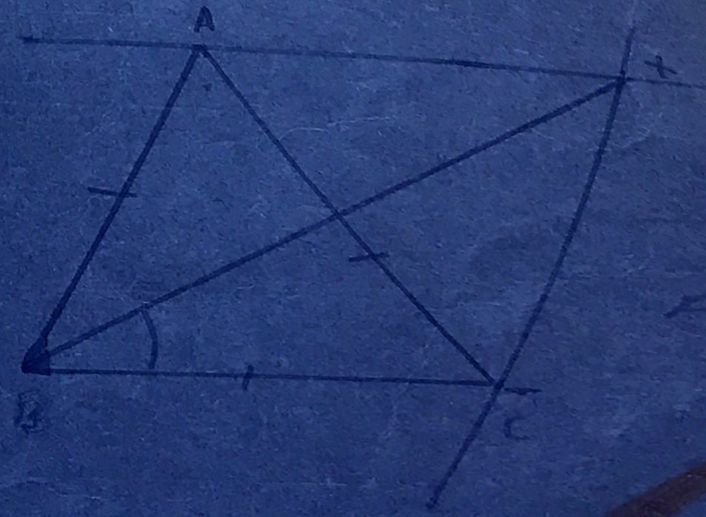
9.

39·12 / 6·0 9 Answer

6 | 36
120 | 1 1 2 0 0
1· | 1 0 8 8 1
1209 | 3 1 9 0 0
4·

BIG HEAD





789
524